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### NEWS IN BRIEF

#### Univac ousts ICL on buses

UNIVAC has won £3.0 million worth of business at the expense of ICL from NBC Computer Services, the organisation that handles DP for the State-owned National Bus Company. NBC is replacing seven ICL 1000 machines with Univac kit that includes three 1100/60 mainframes to be installed at NBC centres in Preston, Birmingham and Relgate, Surrey.

Also on order are about 30 Univac V77/800 minicomputers for local processing at bus operators.

#### NCR expands

AN EXPANSION programme costing \$155 million is planned by NCR over the next four years to increase its capacity in the US for developing and manufacturing semiconductor components.

#### £7.5 million plans

DIGITAL Equipment is considering investing \$5m (£3.5 million) to establish a minicomputer manufacturing plant in Singapore.

#### Oracle potential

THE COMMERCIAL potential for Oracle, the independent Broadcasting Authority's teletext service, is to be investigated by AVS InText, the London-based viewdata consultants and information providers.

#### Hearing delayed

APPLE Computer's application for an injunction to restrain ITT Consumer Products (UK) from allegedly infringing its copyright has been delayed until after October 1.

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## COMPUTER WEEKLY

### Expert system to help with North Sea oil

ARTIFICIAL intelligence is to be used to smooth the operation of North Sea oil rigs, under a development project at Edinburgh University sponsored by BP.

An expert system called AL/X is being developed, based on the ideas in Mycin, which gives medical diagnoses, and Prolog, which assists with searching for minerals.

Workers from Edinburgh

will help oil engineers diagnose the causes of automatic shutdowns on oil platforms, saving large sums of money.

A mishap on a rig can trigger an automatic shutdown in a number of different ways, and when this happens staff have an

immediate problem in trying to work out what went wrong and how production can be started up again safely. Even short delays can cost millions of pounds in lost output.

When in operation, a minicomputer on the rig will ask staff a series of questions about the current state of the equipment, and from the answers and the rules it has been given previously will work out a probable diagnosis of the fault.

The operator can if he wishes divert the course of the computer's questioning or ask it to display the chain of reasoning that has led it to reach a particular conclusion.

## Stop dithering over PAYE—Callaghan

THE failure by the Cabinet last week to decide on whether the huge Inland Revenue PAYE contract should go to open tender, could lead to independent consultants being called in to advise the relevant ministers on the decision.

A spokesman for the Central Computer and Telecommunications Agency said that no decision had been made yet on bringing in a consultancy while a spokeswoman for the Prime Minister said that she had "no idea" when the Cabinet would meet next to discuss the matter.

The PAYE controversy has now reached the level of direct exchanges between the Prime Minister and Opposition leader James Callaghan, on the floor of the Commons.

Last Thursday after Wednesday's inconclusive Cabinet meeting, Callaghan told the Premier in the House that the government "should...stop dithering" about the decision.

She retorted: "You will not succeed in hustling me. This matter is still being considered. There are many computer firms here. We have to get the right computer for the job."

Meanwhile, IBM has denied reports that it is offering to site a manufacturing plant in the UK if it wins the PAYE contract (CW, July 10), adding that it is not seeking a location in the EEC for a general business group factory.

On reports that IBM might be

prepared to adopt a loss leader approach to the PAYE contract, cutting prices to win the order IBM stated: "It is not and never has been our practice to engage in loss loading."

Honeywell, which has been relatively quiet until now

compared with some of the other contenders in the PAYE contract arena, made its mark last week in the form of letters to The Times and Financial Times from the chairman of Honeywell UK, Ralph Price, making the case for open tendering.

Proposals for harmonisation of national data networks, the creation of an EEC-wide purchasing policy for PTTs, and support for the European microelectronics industry, previewed last week (CW, July 17) have been made by the EEC Commission. It urges the Council of Ministers to accept and begin implementation of all three proposals by the end of the year.

"It wants harmonisation of policies within the CCITT standards body so as to ensure European standard VDU for all public networks. In the Community, a liaison committee with representatives from the Commission and the PTTs to oversee the work.

It also wants an open market for PTT tenders within the Community, to ensure as a first step that at least 10% of national orders are placed in other EC countries.

Details from Industrial Seminars, Sevenoaks, Tel: 0732 89702.

#### CAFS, IDMS trial marriage

From front page problems look trivial; further work should reduce their impact.

CAFS tends to be regarded as a system designed for complete database searches for every query. This of course would be absurdly inefficient, and in fact the approach is to strike the right balance between the number of separate CAFS files established and the time it takes to scan.

The CAFS inquiry language has been written with a view to unqualified personnel making

their own inquiries, and several enhancements are planned in the next release of the software. Among these will be facilities for on-line updating of CAFS files, and an on-demand report generator.

The microelectronics support plan calls for EEC funds of up to 200 million units of account, £120 million over four years, to be devoted to encouraging European process equipment manufacturers to make the plant necessary to enable sub-micron integrated circuits to be made by 1986; to co-ordinate national programmes and to study the application of computers to design testing of chips.

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THE first UK microcomputer dealers to invest heavily in maintenance and service support, hangs in the balance. A creditors' meeting has been called for August 12, and in the meantime a buyer is being sought for the business.

Isher-Woods is the trading name of Rile

Business Systems' marketing operation,

which is principally a Commodore Pet dealership, but also offers Cromemco.

Isher-Woods is based in Luton, and hopes

to continue as a Pet dealer. However, Com-

modore has appointed Computopis of

Leighton Buzzard, only six miles away, as a

dealer.

According to Isher-Woods managing

director Stephen Dilley, it is the mainten-

ance and dealer support operation which

has run into financial trouble and he told

Computer Weekly that while this operation

was likely to cease trading, he was

"optimistic and enthusiastic" for the pro-

pects of Isher-Woods, and was willing for

his company to take over existing Rile

maintenance commitments.

A spokesman for Robson

Taylor, the firm of chartered

accountants retained by the holding company, was less

optimistic, but hoped that the

company could be sold as a

going concern.

An announcement on the fu-

ture of microcomputer

manufacturers, Nascom, is

thought to be imminent, and

discussions between the re

ceiver and several potential

buyers are continuing.

**Moving into micros**

Hi-Fi equipment chain Laskys

has moved into the home and

business microcomputer mar-

ket with the acquisition of

Liverpool-based dealer,

Microdigital.

The new 3033 model is ex-

pected to come below the 3033-N

announced last November, and

to be designed specifically for

transaction processing. It will be

field-upgradable to a 3033-N and

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IBM is thought to have stock-

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Computer Weekly has a circulation of over 40,000, making it the highest selling computer magazine in the UK.

Computer Weekly is price leader in the computing industry, and the most cost effective magazine for computing news, features, software reviews, advertisements, and editorial comment.

Nowadays most contractors are self-employed and therefore pay Class 2 contributions, who are not entitled to unemployment pay, and they in any case, like all sensible contractors, should insure

themselves against loss of earnings through sickness, through some private scheme.

The only other comments I should like to make about the article, in case permanent staff are thinking of "going freelance", are that you are much more likely to end up on a stock control system for a paint manufacturer in Bootle than you are to be working in Rome, and the only way to find out about contracting is not to read articles, but to do it!

It is only those people who don't work through agents, and who can fool the tax man, and who therefore pay Class 2 contributions, who are not entitled to unemployment pay, and they in any case, like all sensible contractors, should insure

themselves against loss of earnings through sickness, through some private scheme.

You say "contractors are virtually self-employed and consequently do not pay national insurance". This is completely wrong. Everyone who earns above a certain minimum national insurance of one sort or another.

Nowadays most contractors are self-employed and therefore pay Class 2 contributions, who are not entitled to unemployment pay, and they in any case, like all sensible contractors, should insure

themselves against loss of earnings through sickness, through some private scheme.

I HAVE been a contractor programmer for over seven years and cannot allow the Page Six article (CW, July 17) to go without comment.

The only way to avoid this is to start your own limited company, in which case you employ yourself, and pay both the employer's and employee's contributions yourself.

It is only those people who don't work through agents, and who can fool the tax man, and who therefore pay Class 2 contributions, who are not entitled to unemployment pay, and they in any case, like all sensible contractors, should insure

themselves against loss of earnings through sickness, through some private scheme.

I am a member of many years standing of the Central London branch of the Institute of Data Processing Management, and have just left our annual general meeting without any full comprehension of the proceedings.

This year's affair was held in a modern, well-appointed auditorium with both air conditioning and public address, but unfortunately the telephone connection and the 161 lines shot out on

## COMPUTERVIEW

# National defeatism

THE reaction from trades union leaders and the Opposition in Parliament to the government's proposals to relax the Post Office monopoly were predictably depressing and defeatist. The country will be flooded by a stream of cheap Japanese imports, went the chorus, and shorn of their cosy relationship with the Post Office, GEC and Plessey will be swept away on the tide.

In fact, the proposals include adequate safeguards to prevent this happening, and there are a few signs that the government is beginning to attach a higher priority to buying British, or at least in Britain, than it originally envisaged.

Soaring unemployment figures have a salutary impact even on the most dogmatic of administrations.

What is so far missing in the government's strategy is any clear commitment to putting British industry first. Industry Minister Sir Keith Joseph has consistently said that the most appropriate way to foster new technology is by the government issuing development contracts to UK companies for the things that it will shortly need in its own operations — and Ukito, the new pressure group for the British-owned computer industry, plans to turn those words into action.

What Ukito would like is for the government to put together a five-year programme outlining its anticipated information processing requirements. Having done so, it should sit round the table with Ukito and identify which of the requirements were not met by existing products from one or other Ukito supplier.

Once identified, these should form the basis of development contracts for UK companies, funded at least in part by the government.

In Ukito's view, if such an approach were adopted, the government or group of companies which had received the development contract would be on the inside track for the eventual contract even if it were put out to open tender.

This seems an eminently sensible approach, and one in line with Sir Keith's stated intention for industry support.

However, the government's lack of interest in (or is it awareness and understanding of?) unique British products like ICL's CAFS, the content addressable file store, is incomprehensible to our competitors in other countries. If CAFS were a CII-Honeywell Bull product, the French government would by now have said "mon dieu, you don't have a VME/B version yet? But all our major

departments are going over to VME/B very soon, we want a CAFS system in every department as soon as possible. How much money do you need to have?"

Instead, with not unlimited resources and time, CAFS will be as big a commercial success as mainstream products already are, ICL has to put the priority on CAFS than is necessary to guarantee the technological lead represented by CAFS has established by the time the product is available in volume.

Prestel is already looking ominously like a missed opportunity — and the first set only went Downing Street earlier this month. Why are there banks of coin-operated Prestel terminals at Heathrow that foreigners entering the country can see and use? Telecom cannot."

The British Standards Institution was one body mentioned by Industry Secretary Sir Keith Joseph as a prospective approving authority. A spokesman said it had not yet talked to the Department of Industry. The issue was important to the institution, he said, but it would mean an enormous expansion in work.

Ideas — brilliant ideas — are two a penny in Britain.

The ever-present factor which prevents them being successfully exploited is a chronic nationalitis complex. Instead of talking flippantly and dismissively about the implementation of people who want to use "weird new-fangled devices" to their telephones and Opposition industry spokesman did in the Commons week, industry and users alike should be cheering relaxation of the Post Office monopoly from the top.

## LETTERS to the EDITOR

# Doors not closed to older trainees

IN answer to George Penney on the subject of applicants over the age of 35 being acceptable as newcomers to DP (Letters, July 3), I would like to comment on our own experiences as a training institution.

In general, TOPS courses in programming do tend to debar the older applicant, but we have actually had a few here who were allowed through that hurdle and George will, I feel sure, be pleased to learn that they have been very successful.

I particularly recall a man of 52 who wanted to retrain, having understood that he would have to accept a trainee's position with commensurate salary and be answerable to staff half his age; like other "older" people he was a little slow at first

in learning new material but he was a good steady worker and applied himself very well; eventually he was accepted as a programmer by a large commercial organisation (no, not a local council) and was in a position to give them 12 or more years of steady, reliable service and provide for a measure of stability in the department.

We have had other similar instances of success in the same direction, so clearly the doors are not closed at all, but I must stress that we do feel obliged to point out to all applicants quite clearly the problems that they have to face in terms of salary, and the fact that the average age of the industry is fairly low, thus making their employability less certain; indeed we feel obliged to

compensate by setting higher levels of selectivity than we might otherwise apply for younger applicants.

I do agree, however, with George Penney's feelings; too many companies are troubled by people leaving after a two or three years settling-in period, just as they are beginning to make a useful contribution to the output. Older people are far more likely to stay for longer periods on average than their younger counterparts, so let us see a few more companies take positive steps to recruit for stability.

Let me assure your readers, and particularly those who are active in the 40 BCS specialist groups, that there is no question of cutting their activities and no point in cutting their budget. The net cost to BCS funds of the

BCS, London

## No cuts for BCS specialist groups

I WAS very concerned to see your report (CW, 10 July) that an anonymous spokesman for the BCS had said that if the proposed increases in membership fees are not approved at the AGM "there would have to be cuts at all levels, especially in specialist groups and publications".

Far from making any cuts vital to the continued existence of the BCS, the editor of the specialist groups note and become more professional.

Let me assure your readers, and particularly those who are active in the 40 BCS specialist groups, that there is no question of cutting their activities and no point in cutting their budget. The net cost to BCS funds of the

BCS, London

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# Industry pleased, union 'disgusted' at easing of telecomms monopoly

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The ever-present factor which prevents them being successfully exploited is a chronic nationalitis complex. Instead of talking flippantly and dismissively about the implementation of people who want to use "weird new-fangled devices" to their telephones and Opposition industry spokesman did in the Commons week, industry and users alike should be cheering relaxation of the Post Office monopoly from the top.

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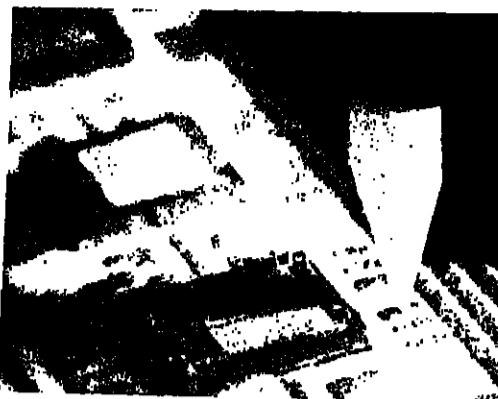
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**PAGE SIX**for programmers  
and analysts

# How micros can make work more satisfying



A chip being wired up.

TWO weeks ago we looked at the likely impact of the microprocessor on the job prospects for today's programmers and we found that, far from being a threat, it promised endless expansion in the demand for competent programmers (CW, July 10).

A former colleague now working in the micro field has suggested to us that not only would the micro provide plenty of work, but it would also make the job of the programmer significantly more satisfying and less frustrating.

"Of course if it happened to be

agreed and is thus unlikely to find itself seriously wrong-footed by future developments.

The ISO model has seven levels; the top three levels are associated with the aspects of information processing, and there is a clean break between them and the other four, which perform the functions of message delivery.

These four levels are the transport, the network, the link and the physical levels, the last three being levels one, two and three of the X25 packet-switching definition, ICL plans to put all four into a new Multi-Function Communications Processor, MFCP, expected shortly.

This will be code-compatible with the existing front end processors and, by making a clear division between transmission and information processing, ICL is insuring itself against future developments.

Distributed Message Router DMR, routes messages from terminals to the appropriate computer.

Networking is to become standard for JES3, as well as support for the new disc devices 3375 and 3380. It will also be possible to store data in card image form and as print lines.

Also due at the same time is an extension feature of the architecture which will allow cross memory services. This means that user areas will be able to communicate directly between programs in different computers. It is transparent to the user, and for example enables the local host to pass a file inquiry to a remote computer.

As an example, it cites the possibility of European PTT's buying from AT&T or the US the ACS Advanced Communication System, which would take all message handling applications out of the hands of the user.

The top three layers of IPA handled in the three mainframe operating systems are the application itself, the presentation, which provides terminal or format control; and the session, which provides connection and recovery control.

ICL's original model included the session and transport levels in levels above or below, but it plans to implement the ISO model.

The principal alternative protocols will be the international HDLC/X25 International standard and ICL's own Full XBM.

The latter adds complete device independence and flow control to the existing ICL-XBM protocol.

Several facilities which will be offered in IPA have been defined. Remote Session Access, RSA, allows a terminal user to access any service available on the network; connection has to be made through the terminal's local host, and RSA would be used for things like compiling and debugging an application

on one's own test runs and type in corrections. But usually it went into the queue, so you might have to wait half-an-hour for the results.

Things are not much different for most programmers today, and the large system devoted solely to development did not seem to be the solution either.

"The answer is the microprocessor," development machine. Everything is built into the desk, and the only thing you may need to share is a printer — perhaps one to each three development machines, because printers will continue to be comparatively expensive.

"The point is that production software is very different from development software, and the micro makes it possible to separate the two."

"The programmer keys in his own program and compiles it as he goes in modules. Interactive debugging becomes cost effective and is easier to provide on a micro."

"Most of the applications people want to write these days are interactive, so interactive debugging is ideal."

"But surely you can't get IBM Cobol on a micro?"

"No, that's true," he agreed. "IBM Cobol is somewhat in advance of any micro Cobol. But the best micro Cobols are at about the same level as Cobol on IBM's Series 1 and System 34, or Honeywell Level 6 mini."

"Clearly you can't use a micro development machine for maintenance of existing programs. But there is no reason why you shouldn't use one for new applications, with a compatible subset of IBM Cobol."

Grove however says that this is not the most of the complex software structure because you don't need to do this and he believes that programs should be as simple as possible.

"And micros are bringing otherside which will make pro-

## ICL launches information processing architecture

● From front page  
agreed and is thus unlikely to find itself seriously wrong-footed by future developments.

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Application Data Inter-

face Transfer Facility, allows users to transfer,

from one computer or terminal, to another computer, and activated either by a user or an application program at one end of the link.

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## SOFTWARE FILE

# User groups' ideas in MVS extensions

IBM is planning Release 2 of System Product, its umbrella title for the MVS extensions, for July 1981.

The upgrades are being made in response to suggestions from user groups Share and Guide, which have requested such features as JES2 networking, improved spool reliability, the facility to offload spool information and store on tape as well as the capability of a user to edit his own exits as required.

Distributed Message Router DMR, routes messages from terminals to the appropriate computer.

Distributed Application Facility, DAF, provides for creation of distributed transaction processing services by establishing a communications link between programs in different computers. It is transparent to the user, and for example enables the local host to pass a file inquiry to a remote computer.

Network is to become standard for JES3, as well as support for the new disc devices 3375 and 3380. It will also be possible to store data in card image form and as print lines.

Also due at the same time is an extension feature of the architecture which will allow cross memory services. This means that user areas will be able to communicate directly between programs in different computers. It is transparent to the user, and for example enables the local host to pass a file inquiry to a remote computer.

As an example, it cites the possibility of European PTT's buying from AT&T or the US the ACS Advanced Communication System, which would take all message handling applications out of the hands of the user.

The top three layers of IPA

handled in the three mainframe operating systems are the application itself, the presentation, which provides terminal or format control; and the session, which provides connection and recovery control.

ICL's original model included the session and transport levels in levels above or below, but it plans to implement the ISO model.

The principal alternative protocols will be the international HDLC/X25 International standard and ICL's own Full XBM.

The latter adds complete device independence and flow control to the existing ICL-XBM protocol.

Several facilities which will be offered in IPA have been defined. Remote Session Access, RSA, allows a terminal user to access any service available on the network; connection has to be made through the terminal's local host, and RSA would be used for things like compiling and debugging an application

on one's own test runs and type in corrections. But usually it went into the queue, so you might have to wait half-an-hour for the results.

Things are not much different for most programmers today, and the large system devoted solely to development did not seem to be the solution either.

"The answer is the microprocessor," development machine. Everything is built into the desk, and the only thing you may need to share is a printer — perhaps one to each three development machines, because printers will continue to be comparatively expensive.

"The point is that production software is very different from development software, and the micro makes it possible to separate the two."

"The programmer keys in his own program and compiles it as he goes in modules. Interactive debugging becomes cost effective and is easier to provide on a micro."

"Most of the applications people want to write these days are interactive, so interactive debugging is ideal."

"But surely you can't get IBM Cobol on a micro?"

"No, that's true," he agreed. "IBM Cobol is somewhat in advance of any micro Cobol. But the best micro Cobols are at about the same level as Cobol on IBM's Series 1 and System 34, or Honeywell Level 6 mini."

"Clearly you can't use a micro development machine for maintenance of existing programs. But there is no reason why you shouldn't use one for new applications, with a compatible subset of IBM Cobol."

Grove however says that this is not the most of the complex software structure because you don't need to do this and he believes that programs should be as simple as possible.

"And micros are bringing otherside which will make pro-

## APL interpreter for micros makes debut

A MICRO version of APL, the powerful high level language based on mathematical notation, is now available in the UK.

Canadian firm Telecompute has pointed Alan Pearman Ltd of Chester as sole UK agents for TIS APL, an interpreter for Z80 based micros.

TIS APL is based on Sharp APL and therefore uses quasi functions for file handling and mainframe communication. Versions exist for Superbrain, Commando System 3 and Z-2H, Altair TRS80 and Maple.

The interpreter needs 28Kbytes of memory using its own operating system and is said to load 10 times faster than existing implementations.

Other implementations of APL for micros include a version running under CP/M on the Apple II, the MCM version used by British Leyland subsidiary BL Systems in the UK, Vanguard APL, and the IBM version for the 5100 series.

Although micro versions of APL are designed to cut the high costs of time sharing, opinions vary among APL enthusiasts as to whether the use of power facilities in the financial saving, given that present micro versions of APL are necessarily restricted in facilities and workspace.

APL is based on Sharp APL and therefore uses quasi functions for file handling and mainframe communication. Versions exist for Superbrain, Commando System 3 and Z-2H, Altair TRS80 and Maple.

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## Checking structured programs

A PROGRAM tool to check the "shape" of structured programs is available from Peter Bell of Deansgate Close, Cheltenham. Called Chartit, the product is written in Cobol to run within 60K-bytes on any machine supporting the language, and costs £1,950.

Chartit aims to discipline and control the quality of structured programming. Using data directly from source code, Chartit will support Global Resource Serialisation with additional real time displays.

IBM also announced enhancements to the 303X line (CW, June 18) such as extended addressing, improved spool reliability, the ability to offload spool information and store on tape as well as the capability of a user to edit his own exits as required.

Distributed Message Router DMR, routes messages from terminals to the appropriate computer.

Networking is to become standard for JES3, as well as support for the new disc devices 3375 and 3380. It will also be possible to store data in card image form and as print lines.

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The lockout will occur at the

much lower level of dataset,

thus allowing a second process-

# IBM 'worried' by security rival

The system uses three databases all accessed through VSAM. The first, Logonid, contains the market in security software for IBM's MVS operating system. It is rumoured that IBM is alarmed enough at the competition for its own product, RACF, to offer bonuses to its US salesmen who win contracts against the newcomer, ACFC2.

According to CGS European marketing manager Zoran Pirjevec, the Software Security Committee of the IBM user group Share. When IBM failed to respond, committee member Barry Schrager set out to solve the problem himself.

## MICRO NEWS by Eileen Stainer

# Wembley show wins more visitors

THE 1980 Microcomputer Show moved to the Wembley Conference Centre last week, an extra 20 stands having caused the move from the Bloomsbury Centre Hotel. And the move was justified. Conference organisers Online estimate this year's three-day attendance at 8,500, an increase of some 500 over last year.

**1,000 orders on first day for Lyme**

OVER 1,000 orders were taken on the first day of the 1980 Microcomputer Show for the Lyme series 5000 video terminal, which was making its debut.

Of this, 800 will be going to West Germany in a £500,000 contract and it is thought that the Lyme 5000 will make a major impact on the European market as it is capable of being a terminal to any mainframe, mini or microcomputer.

It was being shown on the stand of James Scott Electronics Developments, which is part of the William Press engineering group. The Lyme series 400 was also being shown.

Future plans for the 5000 are for floppy disk and graphics options and to supply RAM for customer software operation.

**Profits fall blamed on TV games**

A DROP in profits last year of £1 million has been attributed by James' company John Waddington to the failure of its electronic television games venture, Videomaster.

Turnover for the group increased from £23.9 million the previous year to £28.6 million, while overall net profits fell from £1.7 million to £0.1 million. Without Videomaster the net profits would have been £2.7 million; it is now up for sale.

**Using the Z8000**

A FOUR-DAY design course using the Z8000 is being organised by Cambridge Micro Computers for people with microprocessor or computing experience. Entitled "Designing with the Z8000 microprocessor", the course will cover the Z8000 CPU and instruction set with the peripheral devices.

none has arrived.

Seminars were organised for the duration of the show covering such topics as microelectronics applications, microprocessors in industry, microsystems in business and microcomputers in education.

One of the more recent companies to be set up, Specialist Micro Designs, shared a stand with Product Launch, a consultant marketing company set up by the ex-marketing director of Nascom, Kerr Borland (CW, February 21). While Nascom has been suffering the consequences of reorganisation, four of its engineers have formed a consultant design company, SMD.

SMD is being contracted to complete the development of peripheral products for the Nascom 2 system.

Howard Birkin, ex-engineering manager of Nescom and now an SMD director, demonstrated one of its more recent consultancy jobs, a Prestel adaptor.

Product Launch was displaying a microsystem application product for its client, Zonal, based in Edinburgh. The LT80 bar till, which was initially launched on EPROM 80, is a 280-based microcomputer with a keyboard related to types of drinks and foods normally available in bars (CW, June 20).

Zonal is planning to rent the units to interested breweries or hotel chains, such as Scottish and Newcastle, Allied, Whitebread, Naafi and Mecca, for 22s per system per week. The systems are being manufactured at a rate of over 100 per week at a factory in Croydon.

James Scott Electronics De-

velopment, part of the William Press engineering group, occupied a stand and a suite to display the Lyme series 4000 and the new series 5000 video terminals.

Memorex UK managing director Mike Kitching said no

operating system kernel.

• Intel's latest single chip microprocessor, the 8051, which was launched at this year's National Computing Conference, will be available in three versions from GEC Semiconductors. The 8051 incorporates 4K-bytes of PROM, the 8051 4K-bytes of EPROM and the 8031 has no internal program memory. All versions have a basic 128 bytes of RAM.

The companies are planning to develop jointly a talking computer on a chip, by 1985, which will be based on a 32/64 bit extension of the iAPX 432 with on-board RAM, ROM and

## COMPANY NEWS

### Memorex sees IBM price cuts as major cause of its problems

FOLLOWING its announcement of a net loss of nearly \$22 million for the second quarter of 1980 (CW, July 17) Memorex has admitted that it expects its results for 1980 to show an overall loss.

A major cause of the company's shaky financial position is a 2.6% decline in outright sales to \$135 million between the second quarter of 1979 and the same period this year. Sales to third party financing institutions fell from \$31.6 million to \$24.6 million in the 1980 second quarter.

Memorex has cited the price

cuts made by IBM in January and May last year on the 3350 disc drive as a major cause of its problems and also the expectation by IBM users that IBM will be able to deliver the new 3380 drive (CW, June 19) in volume starting later next year. But Storage Technology, which faces the same competition from IBM, is still reporting healthy financial results.

On the brighter side Memorex reported an 18.8% increase in its rental and service revenues to \$50.3 million in the 1980 second quarter.

The second quarter loss included writing off stocks and covering the cost of laying off staff worldwide.

Memorex UK managing director Mike Kitching said no

more redundancies would be made. He added that the company's financial position had also been adversely affected by a drop in sales of its audio and video tape products which account for about 20% of Memorex business.

### Orders up 43%

NIXDORF Computer has started 1980 well with orders up 43% in the first five months of the year, following net profit of DM 85 million (£4.1 million) on turnover up 23% at DM 1,280 million (£312 million). It has increased its workforce by 800, bringing the total to over 12,000. The order book now exceeds last year's turnover figure.

## CW SHARES TABLE

Dated 22/7/80

Index: 101.81 Change: +2.07

Period: London Stock Exchange Period: New York Stock Exchange

1980 Stock Price Change

High Low Stock Price Change

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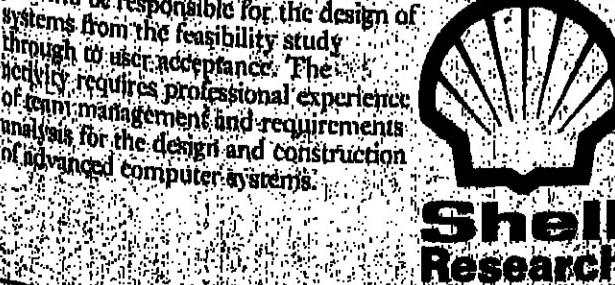
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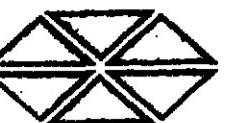
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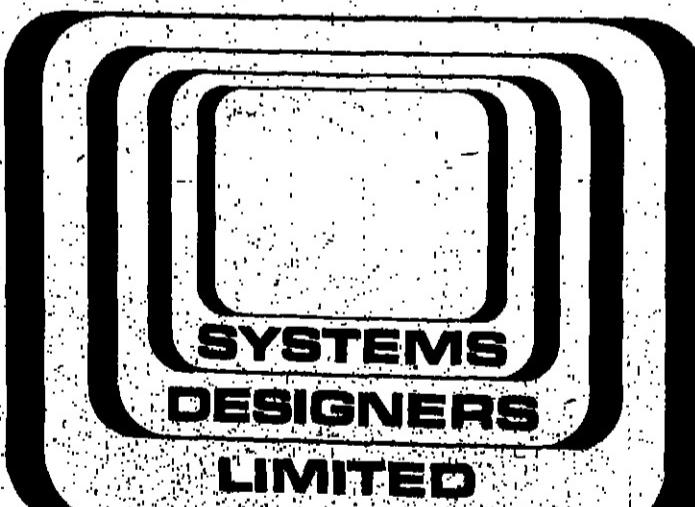
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Our Client is a dynamic multi-national Computer Manufacturer who has achieved an enviable degree of high technological sophistication throughout their product range and are enjoying a major share of the market. The Company has a large, successful and loyal customer base which offers a continuing source of business.

To optimise upon their planned expansion, they require further Sales Executives to join their established, dedicated team. They offer prospects of working within the majority of business environments, specifically GOVERNMENT, MANUFACTURING and FINANCE. As a Sales Executive, you can expect excellent pre and post sales support, realistic quotas and a generous guarantee, which will be provided during the comprehensive training period.

Applicants need to have a history of success in the medium and large systems environment, coupled with ability to identify with Board level management.

Genuine promotion prospects are open to those applicants who wish to take advantage of the company's full and diverse structure, so if you wish to further your career by joining this progressive Computer Manufacturer, please contact now:-

RICHARD CHAMPION ON: 021-236 3781 (24 hour answering service)  
OR: Hagley 884166 (evenings and weekends)



Specialist Computer Recruitment Ltd.

London 01-836 0871 3 Mandeville Place, Wigmore Street, London W1M 5LB  
Birmingham 021-236 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY  
Manchester 061-833 0427 Blackfriars House, The Parsonage, Manchester M3 2JA  
Brussels 010 322-640 7151/71 Avenue Louise 327, Boite 4, 1050 Brussels

## Targa OPERATIONS

### DATA PROCESSING MANAGER

CMEG.

A Manufacturing Company in Mid-Essen are seeking an experienced computer professional to assume the role of Data Processing Manager. The successful applicant will have extensive knowledge of IBM 3270 and/or an ANALYST/PROGRAMMER on IBM SVS4 systems. Pleasant working conditions will be found. Salary is completely negotiable according to age and experience.

### ICL PROGRAMMERS/SYS. ANALYST

£6,700-£9,000

A Manufacturing Company on the Swiss/West German border are looking for Programmers with two or three years' COBOL experience and a Systems Analyst with either four years in the industry or at least eighteen months as an Analyst. Company benefits, including pension scheme and insurance.

### SENIOR ANALYST/ANALYST

C. £9,500

An organization in London require an analyst and senior analyst with a good commercial/financial background. For the senior post a minimum of four years' experience is required and two years' experience for the junior position.

### ICL/COBOL

C. £6,250

A programmer with a minimum of 2 years' Cobol experience on financial and/or banking systems is required by our clients in London. A knowledge of RPG II would be an advantage. In return the company will provide all usual benefits attributed to banking.

### IBM OPS ANALYST

C. £6,000

Experienced Operators who are conversant with DOS/VSE, POWER/VSE and CICS. Days ONLY.

### IBM DOS/VSE OPERATOR

C. £6,000

Well known company in West London require an operator with minimum of two years' experience, 24hr working only. Good company perks.

### HONEYWELL/GCOS/DS2000

£10,600

Hannover company require a Senior Op. and Operator with 1-3 years' experience. No. Manufac. etc.

### ICL JNR. & SNR. VMEB OPS.

£10,250

1-2 years VMEB experience for junior posts and 3-4 years' VMEB including a thorough knowledge of software etc., for the senior posts are required by our clients in London.

### ICL 2904

C. £4,500

All operation with a minimum of 1-2 years' COBOL experience including full knowledge is required by our clients in Harlowshire to operate their mainframe system.

### PRIME/PRIMOS

C. £6,500

City-based company require an operator with one year's prime experience in a COBOL system with partly batch on evenings. Good company benefits.

### CDS/NOC

C. £6,300

Large London site requires senior operator and operator with two years' COBOL experience, including experience on large mainframe suitable. Shift system works.

**TARGA COMPUTER SERVICES**  
46/47 LONDON WALL  
LONDON EC2M 5TE 01-638 6381

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We are successful manufacturers and distributors of spectacle frames. The parent company is located in Munich. Over 3,000 people engaged in research, production and sales are employed by us and our affiliated companies both in Europe and overseas.

The Central Data Systems department is charged with providing effective services to the departments of our parent company and all our plants and sales subsidiaries. Existing applications are based on a series of IBM Systems/3, /32 and /34 computers.

We have an opening for

### RPG II PROGRAMMER/ANALYSTS

Who will have sound analytical skills, be able to demonstrate good working knowledge of on-line systems, have 2/3 years' programming and system knowledge and a broad understanding of most facets of business systems development. Working knowledge of the German language is essential; knowledge of a second language (French) would be an asset.

We offer an annual salary from DM 50,000 to DM 80,000 (approx. £12,500 to £15,000). Benefits include relocation expenses, flexible working hours; up to nearly 6 weeks holiday, subsidised restaurant, generous life cover and contribution to health insurance. Removal assistance is assured.

Please submit your curriculum vitae with your photograph and telephone number together with details of your past experience including references to:

OPTYL BRILLEN VERTRIEBS-GMBH

Klaus Peter Stader, Manager Central Data Systems

Haus Böckelerstrasse 2 a D-8013 Herrn/Munich

West Germany, Tel: (010 43 86) 46081

Interviews will be held in our London based sales office.



**PROGRAMMERS**  
London IBM Cobol/PL/I/Marc IV

Tel: Roger Barnes 01-638 6380  
46/47 London Wall, EC2M 5TE



.. CONTRACTS .. CONTRACTS .. CONTRACTS ..

# Contracting is now a 'respectable' profession

by Peter Lynch

THE contracting business is now losing its "body shopping" image, and that overused word in the DP industry, "professionalism" is being applied to an integral and much valued source of skills that forms the basis of a new service industry that the DP world cannot ignore.

The DP manager is no longer looking to contractors for just coding; he now requests expertise that for various reasons he does not have in-house.

DP managers now are very specific in their requirements i.e. PL/I, CICS, DL/I or Database Administrators, technical writers, Cobol, IDS, TDS, systems programmers with knowledge of database, TP and relevant operating systems.

poor programmer or analyst expected to be paid, and six or seven years ago one was constantly hearing of contract agencies going out of business and leaving the analysis and programmers, etc without their payments. This has not completely changed, but nowadays the business is much more professional and it has become an industry in its own right.

We now have the service bureau and the software house and the contract house, the last two often competing for the same kind of business.

The experienced contractor knows what agencies he can trust to pay promptly, negotiate extensions, and try to give continuity of employment when requested or available. The professional contractor should also try to ensure that three or even four agencies do not put up his profile to the same client — it loses him credibility and can be embarrassing for the client when agencies then blicker over "ownership" of the said contractor.

Some years ago the contract market got itself a very bad reputation. Unfortunately a number of so-called cowboys — by this I mean the agencies who saw easy pickings — started to sell the idea of supplying contract programmers or analysts to the users. The problem came when the

lously guard their reputation as it follows them throughout their career and is checked on frequently.

It's a daunting task for the would-be contractors to find out where they can go for the correct advice. Firstly, they should consider carefully whether they are good enough to be a contractor. Have they the skills and temperament that are required in today's DP scene? The would-be contractor should talk to experienced contractors and contact respectable agencies to discuss pay, sickness benefits, holidays, mortgages etc. He should choose his agencies carefully and ensure he is getting paid the correct market rate for his services and not, after accepting a six-month contract, arrive on site only to find that he is being paid £50 a week below other contractors and is only subsidizing his agent's Jaguar.

Contractors should je-

The opportunities and rewards for contracting are immeasurable. International assignments, high pay, tax advantages and an ever-changing DP scene all combine to make contracting a worthwhile career for the enlightened DP professional.

I believe that the future in contracting is a very big business. Programmers realise that they have special talents. Why should they sell those talents to software houses cheaply and then be charged out at enormous rates to users? Why not capitalise on that experience themselves? It seems to me that more and more users realise that they do not need to use software houses to supply them with these programmers when they can go directly to the contract houses who, while not taking any project responsibility, are doing exactly the same thing as

the software houses.

Contracting is here to stay. If someone had said 10 years ago that such a large proportion of the industry was now very specific, the state of the market in the North is both healthy and competitive. The contracting trend is obviously closely allied to the success in marketing a product by computer manufacturers. Examples include new packages and major developments by IBM, an increase in hardware sales by both Univac and Honeywell, etc. It is worth noting that these seem to be at the expense of ICL, and for this reason the contracting market now has a surplus of ICL-oriented contractors.

We hope this is a temporary situation, as it is in all our interests for our major British computer manufacturer to have a substantial share of the market. The North of England is serviced by some of the best contract agencies in the UK. Most Northern agencies are continually striving to improve their presentation, professionalism and image as suppliers of high

quality computer professionals. Throughout the North there are agencies of all sizes from one-man operations through to large international companies with multi-million pound turnovers.

Size should not be the only criterion used in selecting an agency by either user or contractor.

It is possible for a company to grow at a very fast rate at the expense of the contractor by paying less than the market rate in force at the time. To the contractor it is of the utmost importance to evaluate the financial stability of any contract house through which he is considering marketing his services. The North is very fortunate in having a number of smaller contract houses that offer a good personal service and have a reputation for fairness.

What we should be looking for in the operation of the contract company is a high degree of proficiency. From first contact, by telephone or letter, the contractor should be invited in for an initial interview and asked to fill out a detailed application form or supply a CV. References should be asked for and qualified.

I believe that the contract house operation will become a very significant force in the computer service industry over the next few years.

The author is general manager of John Goldsmith, North

# CONTRACTS IN THE NORTH

Due to our clients increasing demands for contract staff, we require the following expertise:

UNIVAC 1100 SERIES COBOL Programmers

HEWLETT PACKARD 1000 SERIES FORTRAN Programmers

ICL 2900 VMEB System Analysts

IBM 370 or 3031 SERIES COBOL OS MVS Programmers

Business Analysts and a Computer Auditor

IBM 3/0 PL/I Programmers

ICL 1900/2900 (Large Systems) TP Programmers

Some of these assignments are immediate starts

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Computer People North

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Mail (no stamp) to FREEPOST, Computer People North, Sovereign House, Stockport Rd, Cheadle, Cheshire SK8 2YD

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### Sales Manager & Sales Consultants

Midlands.

Turnkey & Franchising 10K min. earnings to 25K potential

EMS currently have a number of interesting vacancies for proven performers, with a small but technically experienced unit supporting a growing network of clients throughout the UK. The range's primary product is the Honeywell Level 6 series, for which we have proven integrated systems solutions for plant applications, offering unique marketing advantages. With no doubt, the range of field tested products now available from EMS are beyond the investment capability of all but the leading manufacturers.

Our requirement now is for professional, experienced salesmen capable of rapidly penetrating defined markets with products starting from £20,000 upwards for basic Turnkey Systems. Experience selling to Stockists, Distributors, Manufacturers, Car Leasing Groups, Sales Organisations and general commerce is required. Equally we have a need for senior level staff capable of taking territory control and eventually moving towards controlling entire regional teams.

We seek only experienced salesmen capable of selling a minimum of £200,000 worth of systems to a vast potential UK market. Our modularised software is currently in process of being converted to other leading manufacturers needs and is designed to enhance our market opportunities during the 1980s. Ability to sell sophisticated products under franchise to existing groups or Software Houses would also be of interest. Attractive salaries and commission schemes are available for top salesmen.

Consultant: John Wood—0782 623665.

### Systems and Programming Consultants

Middlesex £31,000

A major systems and bureau group need additional experienced senior staff to provide a consultancy support to a wide and diverse variety of both group and external clients. Project management will be expected to play a major part in the investigation and analysis of client systems and to assist with project planning, monitoring and control. You will maintain awareness of the relevant capabilities of control mainframes, distributed processing, Micro- and Mini computers, applications packages and business management techniques.

Systems Programming Consultants will be expected to continue programming, the design of complex systems, database and data processing through the provision of a consulting service on programming languages including COBOL, PL/I, Business Basic and other languages as appropriate. Assistance with staff training and development will be necessary. A minimum of 8 years' experience is essential for either position category.

Consultant: Carol Atrek — 0782 623665.

### Fortran A/Prog. — Sales Sup- port

Bracknell Negotiate + Car

A leading bureau need an experienced Analyst/Programmer with extensive Fortran experience preferably on Minis, with some real-time and graphics experience. Previous experience in a similar position would be a distinct advantage. The position includes client staff training, price setting negotiations and an amount of Fortran programming.

Salaries will be negotiated according to experience.

Consultant: Carol Atrek — 0782 623665.

### Project Managers Birmingham

£8,000 upwards + car

We need experienced men managers with good system design capability, with experience of Turnkey Group based at our Birmingham Data Centre. Ability to co-ordinate team activities and to handle multiple system requirements, using existing modularised software to reduce development time work content will be desirable.

The major emphasis during the 1980's will be that of rapid shipments from initial contracts, and continued enhancement to existing software with odd custom-built modules within a fixed price environment. We are already looking at the introduction of structured programming and many other production aids. Ability to function as a Business Analyst and assist with tender preparations will be advantageous.

All candidates must have undertaken at least 2 years' Cobol programming at some stage during their career. We seek applicants aged from 27 upwards prepared to work in a demanding environment and control teams of up to 8 staff. Travel to client sites is an important function so a driving license is essential. We offer a modern, informal working environment where promotion based upon results is ensured for all group staff.

Consultant: John Wood—0782 623665.

### IBM Cobol Prog.

Hemel Hempstead Up to £8,800

Our clients, a major engineering group, are seeking an IBM COBOL Programmer with a minimum of 2 years' experience, preferably with knowledge of JCL. Easierive or Personal. The successful candidate will work in a small team using structured programming techniques. Good experience with Stock, Accounting and Distribution systems and 370/BB mainframes running under MVS/JBS 2. Additional facilities are TSP0, IMS and IBM B100 distributed processing.

Consultant: Carol Atrek — 0782 623665.

### IBM Project Controllers and Programming Controllers

Merseyside

Ref. 002.1100A0 £7,500

Candidates should be capable of project planning and control, contract negotiation, cost analysis, and design functions taking projects, with regular user contact, from initial conception through to final implementation to graduate level is preferable.

Consultant: Carol Atrek — 0782 623665.

### Programmers — COBOL, PL/I, Assembler

Hundreds-Uk £10,000 - £15,000

Interesting demands are creating a number of well paid, experienced positions for our systems and data bank. We have hundreds of vacancies now available for analysts with 1-5 years' experience, particularly experienced and preferably with a real understanding of business programming. Opportunities exist for analysts to work in a variety of environments, including DMS, VME, 8086, 8088, 80386, 80486, etc. We have interesting opportunities for analysts to work in a variety of environments, including DMS, VME, 8086, 8088, 80386, 80486, etc. Vacancies exist in every industry throughout the UK, as well as many international locations. If you are interested in the position you are sure to find one to suit your needs. In addition to many, interesting rural locations, there are also opportunities in London and the Home Counties. We are looking for a career form, and see how quickly we move you on forward.

Consultant: Carol Atrek — 0782 623665.

### ICL Systems Designers/ Analysts

Good Negotiable Salaries

We urgently seek experienced ICL 2803/4 Systems Designers and Analysts capable of taking direct responsibility for a small software team looking on customer development for a growing range of ICL clients throughout the Midlands and North who are regularly returning for repeat business. All applicants must have a sound working knowledge of 1800s or the 2803 systems and be capable of managing software development. Ability to function as a Business Analyst and assist with tender preparations will be advantageous.

A good personal personality is essential in regular client contact is involved. We seek a keen and orderly working manner to ensure adherence to group standards. Ability to project forecast and plan is important as work for a client is based upon prior quotes, necessitating tight and meaningful controls.

The ICL unit is located in a small informal administration centre in Newcastle-under-Lyme with easy access to most Midlands and Northern centres. An excellent working relationship already exists for the unit and needs individuals capable of enhancing still further our growing relationship. Attractive salaries and fringe benefits can be available depending upon the level of experience and ability offered. Salary will not be an obstacle for the right candidates.

Consultant: Don Walklate—0782 623665.

### Progs. & Analysts—Banking Systems

Manchester/Cheshire

£8,000 plus

We currently have a large number of vacancies for experienced commercial Analysts and Cobol Programmers in major banking systems involving both IBM and Unicore hardware. Any on-line experience would be particularly advantageous. Hardware retraining will be supplied where appropriate. Interviews are available for all candidates. Please apply urgently for application form. Excellent opportunities currently exist.

Consultant: Carol Atrek — 0782 623665.

### Software Designers & Systems Programmers

Middlesex

To £7,000

Our clients, a major Space and Defence Systems Manufacturer, have over 50 current vacancies for experienced programmers, mostly on a major expansion phase developing a program of new products. The site is located in the South East of the UK and offers excellent opportunities for promotion. Any experience of CICS, DL/1, etc. would be especially welcomed. The system is being developed for on-line enquiry and updating and is becoming increasingly popularly attractive. We currently seek applications from staff who have worked in an Aeronautics, Defense or Space environment. Staff are seeking the opportunity to join a progressive British Group. Relegation assistance to a new location will be provided.

Consultant: Carol Atrek — 0782 623665.

### IBM PL/I/COBOL Progs.

South Coast

Ref. 002.1100A0 £7,500

A Council urgently require 4 additional programmers with 1 year on a major expansion phase developing a program of new products. The site is located in the South East of the UK and offers excellent opportunities for promotion. Any experience of CICS, DL/1, etc. would be especially welcomed. The system is being developed for on-line enquiry and updating and is becoming increasingly popularly attractive. We currently seek applications from staff who have worked in an Aeronautics, Defense or Space environment. Staff are seeking the opportunity to join a progressive British Group. Relegation assistance to a new location will be provided.

Consultant: Carol Atrek — 0782 623665.

### Programmers — COBOL, PL/I, Assembler

Hundreds-Uk £10,000 - £15,000

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# MARTINS

## MANAGEMENT, PROJECT LEADERS, SYSTEMS ANALYSTS, MANAGEMENT.

**SENIOR SYSTEMS ANALYSTS, TECHNICAL SUPPORT ANALYSTS, O&M ANALYSTS.** For on-line Database development work. CAD Engineering and Manufacturing application. Area: Warwickshire. Salaries to £9,000. Ref: SA269

**COMPUTER MANAGER.** Small mainframe. At least 5 years' experience on commercial applications using IBM or UNIVAC. Assembler or RPG. Area: Staffs. Salary: c£8,500. Ref: M69.

**PROJECT LEADER AND SYSTEMS ANALYSTS.** At least 4 years in D.P. Area: Leicester. Salary to £9,000. Ref: SA224.

## ANALYST PROGRAMMERS/PROGRAMMERS, ANALYST PROGRAMMERS/PROGRAMMERS

**ANALYST PROGRAMMER.** At least 3 years' in D.P. using Cobol. Experience with Software Support or Database Design an advantage. Area: Coventry. Salary to £7,500. Ref: P174.

**COBOL PROGRAMMER.** At least 6 months' commercial programming experience with ICL Hardware. Area: Birmingham. Salary: c£5,000. Ref: P492.

**SYSTEMS SOFTWARE PROGRAMMER AND APPLICATIONS PROGRAMMER.** At least 18 months' Cobol preferably working in a DOS environment. Experience using any other manufacturer's Cobol considered. Opportunities to move into inter-active programming using CICS, DL/I, DOS/VSE, DB and TP Systems. Area: Ruthin, Cheshire. Salary: £8,500 plus relocation package. Ref: P77.

**ANALYST PROGRAMMER.** At least 3 years' in D.P. for both maintenance and new development work. Main language RPG, also Cobol. Area: North Warwickshire. Salary: to £8,000 plus relocation expenses. Ref: SA262.

## ANALYST/PROGRAMMERS

**SENIOR PROGRAMMER.** At least 2 years' Cobol. Honeywell GCOS preferred. Area: Near Wolverhampton. Salary: £7,000. Ref: P494.

**PROGRAMMER.** At least 2 years' RPG II. ICL Hardware. Busy Bureau environment writing Programmes and Packages for clients. Area: Central Birmingham. Salary: c. £7,000. Ref: SA263.

**SYSTEMS ANALYST.** At least 3 years' Commercial Systems Honeywell installations. Area: Near Wolverhampton. Salary: to £9,000. Ref: SA243.

**BUSINESS SYSTEMS ANALYST.** At least 5 years' in D.P. Good knowledge of O & M and O.R. techniques, including management services environment. Area: Wiltshire or Worcestershire. Salary: to £9,000. Ref: SA204.

**SENIOR SYSTEMS ANALYST.** At least 5 years' D.P. experience including Project Management level to lead a team of 6 Analysts and Programmers specialising in Sales and Financial systems. Formal Programming background desirable. Honeywell Hardware an advantage. Area: North Staffs. Salary: to £8,500 plus relocation package. Ref: SA277.

**D.P. MANAGER**

for existing ICL Systems 10 installations.

At least 5 years in D.P. including Management level. Knowledge of Assembler or RPG II essential.

Area: Near Wolverhampton. Salary: £8,500. Ref: SA204.

**SENIOR SYSTEMS SPECIALIST.** At least 3 years' experience. Opportunity to work overseas. Area: Nottinghamshire. Salary: According to experience but very competitive. Ref: SA279.

**SENIOR ANALYST/PROGRAMMER.** At least 3 years' using commercial applications. Language RPG 11, ICL 2804. Future promotional opportunity. Area: Birmingham. Salary to £7,500. Ref: SA283.

**D.P. MANAGER** for existing ICL Systems 10 installations. At least 5 years in D.P. including Management level. Knowledge of Assembler or RPG II essential.

Area: Near Wolverhampton. Salary: £8,500 plus relocation package. Ref: SA277.

## ANALYST PROGRAMMERS/PROGRAMMERS, ANALYST PROGRAMMERS/PROGRAMMERS

**PROGRAMMER.** At least 1 year's programming in RPG II or willing to retrain experienced programmer using another language. Area: Leicestershire. Salary: to £6,000. Ref: P604.

**SENIOR PROGRAMMER.** At least 2 years using IBM Cobol. Area: Leicester. Salary: to £7,700. Ref: P330.

**SENIOR ANALYST PROGRAMMER.** At least 3 years in D.P. preferably with IBM Hardware. Language Cobol. Early promotion opportunity to supervisory manager position. Area: Wolverhampton. Salary: to £8,500. Ref: SA264.

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**COBOL PROGRAMMER.** At least 2 years' COBOL New IBM 4341. Knowledge of CICS and DL/I, an advantage but not essential. Area: Worcestershire. Salary: Negotiable. Ref: P513.

**SENIOR PROGRAMMER.** At least 3 years' ICL Cobol and PL/I. Plan to overhaul existing systems and implement packages. Area: Redditch. Salary: to £7,000. Ref: P507.

**COBOL PROGRAMMER.** At least 2 years' COBOL New IBM 4341. Knowledge of CICS and DL/I, an advantage but not essential. Area: Worcestershire. Salary: Negotiable. Ref: P513.

**CLOSING DATE:** 15th August, 1980.

**SENIOR COMPUTER OPERATORS.** 2 years' Mainframe experience any hardware. Area: Birmingham. Senior IBM 370 Operator DOS/VSE or OS. Area: Northamptonshire. Salary: to £5,500. Ref: Q216.

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